REMARKS

This Amendment is filed in response to the Office Action dated November 16, 2005 and accompanies the filing of an RCE. Applicant notes with appreciation the courtesies extended to Applicant's counsel by the Examiner in a recent telephone discussion concerning the case. In light of the Office Action, Applicant has amended independent Claim 1. Further, Applicant has added new claims 7-13. Applicant respectfully submits that the claims, as amended, are patentable over the cited references. Applicant therefore request reconsideration and allowance of the claims in light of the following remarks.

The Office Action rejects the claims as obvious in light of the combination of U.S. Patent No. 5,623,355 to Olsen and U.S. Patent No. 5,892,858 to Vaziri. The Office Action continues to allege that the '355 Olsen patent discloses all aspects of independent Claim 1, except for encoding different values in more than two power levels. The Office Action argues that this limitation is met by the discussion of duobinary modulation in the '858 Vaziri patent. Applicant respectfully disagrees with these rejections.

I.   Independent Claim 1

As best understood, the Office Action contends that because the '355 Olsen system discloses transmitting a zero "0" bit at one power and a one "1" bit at another power, this is modulation of different values into different power levels. The '355 Olsen patent describes a binary transmission system for use over long distances. In this, two states in the laser drive are used to overcome the switch on delays of the laser. One state of the laser represents binary level 0 and the other represents binary level 1. (The system uses a low power level for binary level 0 to avoid "switch on" problems with the laser.) When a binary word is converted for transmission every binary bit is converted to a corresponding laser output signal, i.e. for word 1101, the laser would output four pulses, each one corresponding to one bit (the level depending on whether the bit is 0 or 1). Specifically, at time t_0, the system would transmit a first signal at power level high, at time t_1, the system would transmit a second signal at power level high, at time t_2, the system would transmit a third signal at power level low, and at time t_3, the system would transmit a fourth signal at power level high. The system of the '355 Olsen patent is not directed to the

problem of how to increase data transfer rates. It does not cover multi-state transmission systems having more than two different power levels.

In contrast, the claimed invention is directed to the problem of how to maximize data transfer in a transmission system with a relatively narrow bandwidth. To do this, <u>different sequences of bits</u> are represented by different optical power levels. This is described on page 1 of the application as filed at line 12 and illustrated in Figure 3. As shown in Figure 3, bit sequence 00 is represented by power level P_1, bit sequence 01 is represented by power level P_2, and bit sequence 10 is represented by power level P_3 etc. In this way, in the claimed invention, a binary word such as 1101 can be represented by two optical signals, rather than 4 as would be the case for the system of the '355 Olsen patent.

In short, what the '355 Olsen patent fails to teach or suggest is that throughput can be increased by assigning sequences of bits to different power levels for transmission. In the '355 Olsen patent, it takes four different signals sent sequentially to transmit a four bit data word, while the claimed invention can transmit the data word using two signals, where each signal represents two bits.

Applicant respectfully submits that the '858 Vaziri patent does not supply these missing teachings. The '858 Vaziri discloses duobinary modulation. This does not imply that different value words are encoded in three different power levels. Duobinary modulation is used in wavelength division multiplexing to emulate a sync function. This is a band limiting process to avoid co-channel interference. This has nothing to do with and no relevance to the concept of encoding different value words (i.e. different bit sequences) into different power levels of a multi-power level optical system. Hence, there is no teaching in the '858 Vaziri patent that would lead a skilled person to the claimed invention.

In light of the above, Applicant respectfully submits that independent Claim 1, as well as the claims that depend therefrom, are patentable over the cited references.

II.   Independent Claim 8

Independent Claim 8 is similar to independent Claim 1, but further recites "wherein more than one bit may be encoded into the same power level." This aspect of the claimed invention is

nowhere taught or suggested by the cited references. As discussed above, the claimed invention is capable of encoding more than one bit into the same power level. This is described on page 1 of the application as filed at line 12 and illustrated in Figure 3. As shown in Figure 3, bit sequence 00 is represented by power level P_1, bit sequence 01 is represented by power level P_2, and bit sequence 10 is represented by power level P_3 etc. In this way, in the claimed invention, a binary word such as 1101 can be represented by two optical signals, rather than 4. The '355 Olsen patent nowhere teaches or suggests encoded more than one bit into a power level. It only discloses encoding a 0 in one level and a 1 in a separate power level. As such, Applicant respectfully submits that independent Claim 8, as well as the claims that depend therefrom, are patentable over the cited references.

III.   Independent Claim 14

Independent Claim 14, among other things, recites that the "control device is adapted to control the laser drive current levels such that each of the optical power levels is sufficiently separated from the levels above and below it for the receiver to quantize each level and maintain an adequate bit error rate, thus accommodating non linear source output power versus drive current characteristics." The Office Action argues that the '355 Olsen patent at column 4, lines 4-21 and 47-57 discloses setting the 0 and 1 power levels. However, the reference nowhere discloses that the power levels are sufficiently separated from the levels above and below it for the receiver to quantize each level. As such, Applicant respectfully submits that independent Claim 14, as well as the claims that depend therefrom, is patentable over the cited references.

CONCLUSION

Applicant respectfully submits that the claims as amended overcome the rejection raised by the Examiner and that the claims are patentable. Applicant therefore respectfully requests allowance of the application. It is therefore respectfully requested that a Notice of Allowance be issued. The Examiner is encouraged to contact Applicant's undersigned attorney to resolve any remaining issues in order to expedite examination of the present application.
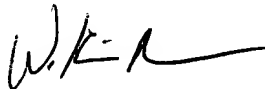
Appl. No.: 09/437,004
Amdt. dated 03/20/2006
Reply to Office action of November 16, 2005 and accompanies the filing of an RCE.

It is not believed that extensions of time or fees for net addition of claims are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required therefore (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 16-0605.

Respectfully submitted,

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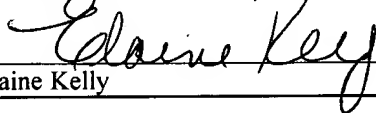Bank of America Plaza
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